

centimeters, a response time of 1 second or less, a deadband of not more than 0.25 percent of full scale, and capability of either reading measurements at least 5 percent below zero or offsetting the zero by at least 5 percent. Digital data shall be recorded at appropriate time intervals such that trend plots similar to a strip chart recording may be constructed with a similar or suitable level of detail.

(2) Other data acquisition components may be used along with the chart recorder during the conduct of these tests. Use of the chart recorder is intended only to facilitate visual evaluation of data submitted.

(3) Allow adequate warmup or stabilization time as indicated in the applicable operation manual(s) before beginning the tests.

(c) *Calibration.* The reference method shall be calibrated according to the appropriate appendix to part 50 of this chapter (if it is a manual method) or according to the applicable operation manual(s) (if it is an automated method). A candidate manual method (or portion thereof) shall be calibrated, according to the applicable operation manual(s), if such calibration is a part of the method.

(d) *Range.* (1) Except as provided in paragraph (d)(2) of this section, each method shall be operated in the range specified for the reference method in the appropriate appendix to part 50 of this chapter (for manual reference methods), or specified in table B-1 of subpart B of this part (for automated reference methods).

(2) For a candidate method having more than one selectable range, one range must be that specified in table B-1 of subpart B of this part and a test analyzer representative of the method must pass the tests required by this subpart while operated on that range. The tests may be repeated for a broader range (i.e., one extending to higher concentrations) than the one specified in table B-1 of subpart B of this part, provided that the range does not extend to concentrations more than two times the upper range limit specified in table B-1 of subpart B of this part and that the test analyzer has passed the tests required by subpart B of this part (if applicable) for the broader range. If

the tests required by this subpart are conducted or passed only for the range specified in table B-1 of subpart B of this part, any equivalent method determination with respect to the method will be limited to that range. If the tests are passed for both the specified range and a broader range (or ranges), any such determination will include the broader range(s) as well as the specified range. Appropriate test data shall be submitted for each range sought to be included in such a determination.

(e) *Operation of automated methods.* (1) Once the test analyzer has been set up and calibrated and tests started, manual adjustment or normal periodic maintenance as specified in the manual referred to in § 53.4(b)(3) is permitted only every 3 days. Automatic adjustments which the test analyzer performs by itself are permitted at any time. The submitted records shall show clearly when manual adjustments were made and describe the operations performed.

(2) All test measurements shall be made with the same test analyzer; use of multiple test analyzers is not permitted. The test analyzer shall be operated continuously during the entire series of test measurements.

(3) If a test analyzer should malfunction during any of these tests, the entire set of measurements shall be repeated, and a detailed explanation of the malfunction, remedial action taken, and whether recalibration was necessary (along with all pertinent records and charts) shall be submitted.

§ 53.32 Test procedures for methods for SO₂, CO, O₃, and NO₂.

(a) Conduct the first set of simultaneous measurements with the candidate and reference methods:

(1) Table C-1 of this subpart specifies the type (1- or 24-hour) and number of measurements to be made in each of the three test concentration ranges.

(2) The pollutant concentration must fall within the specified range as measured by the reference method.

(3) The measurements shall be made in the sequence specified in table C-2 of this subpart, except for the 1-hour SO₂ measurements, which are all in the high range.

(b) For each pair of measurements, determine the difference (discrepancy) between the candidate method measurement and reference method measurement. A discrepancy which exceeds the discrepancy specified in table C-1 of this subpart constitutes a failure. Figure C-1 of this subpart contains a suggested format for reporting the test results.

(c) The results of the first set of measurements shall be interpreted as follows:

(1) Zero failures. The candidate method passes the test for comparability.

(2) Three or more failures. The candidate method fails the test for comparability.

(3) One or two failures. Conduct a second set of simultaneous measurements as specified in table C-1 of this subpart. The results of the combined total of first-set and second-set measurements shall be interpreted as follows:

(i) One or two failures. The candidate method passes the test for comparability.

(ii) Three or more failures. The candidate method fails the test for comparability.

(4) For SO₂, the 1-hour and 24-hour measurements shall be interpreted separately, and the candidate method must pass the tests for both 1- and 24-hour measurements to pass the test for comparability.

(d) A 1-hour measurement consists of the integral of the instantaneous concentration over a 60-minute continuous period divided by the time period. Integration of the instantaneous concentration may be performed by any appropriate means such as chemical, electronic, mechanical, visual judgment, or by calculating the mean of not less than 12 equally spaced instantaneous readings. Appropriate allowances or corrections shall be made in cases where significant errors could occur due to characteristic lag time or rise/fall time differences between the candidate and reference methods. Details of the means of integration and any corrections shall be submitted.

(e) A 24-hour measurement consists of the integral of the instantaneous concentration over a 24-hour contin-

uous period divided by the time period. This integration may be performed by any appropriate means such as chemical, electronic, mechanical, or by calculating the mean of 24 sequential 1-hour measurements.

(f) For ozone and carbon monoxide, no more than six 1-hour measurements shall be made per day. For sulfur dioxide, no more than four 1-hour measurements or one 24-hour measurement shall be made per day. One-hour measurements may be made concurrently with 24-hour measurements if appropriate.

(g) For applicable methods, control or calibration checks may be performed once per day without adjusting the test analyzer or method. These checks may be used as a basis for a linear interpolation-type correction to be applied to the measurements to correct for drift. If such a correction is used, it shall be applied to all measurements made with the method, and the correction procedure shall become a part of the method.

§ 53.33 Test procedure for methods for lead.

(a) *Sample collection.* Collect simultaneous 24-hour samples (filters) of lead at the test site or sites with both the reference and candidate methods until at least 10 filter pairs have been obtained. If the conditions of § 53.30(d)(4) apply, collect at least 10 common samples (filters) in accordance with § 53.30(d)(4) and divide each to form the filter pairs.

(b) *Audit samples.* Three audit samples must be obtained from the address given in § 53.4(a). The audit samples are 3/4×8-inch glass fiber strips containing known amounts of lead at the following nominal levels: 100 µg/strip; 300 µg/strip; 750 µg/strip. The true amount of lead, in total µg/strip, will be provided with each audit sample.

(c) *Filter analysis.* (1) For both the reference method samples and the audit samples, analyze each filter extract three times in accordance with the reference method analytical procedure. The analysis of replicates should not be performed sequentially, i.e., a single sample should not be analyzed three